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Service Tests on Molded Resinoid Products

Simultaneous exposure to chemical fumes and electric current show advantages of the resinoids over metals and ceramics

By Dr. K. Ripper and Director P. Schmidmeier

THE use of resinoid molded electrical insulation has become an extremely important use of these synthetic materials, and their application, during the past few years, is very much on the increase.

Their application has, however, often been purely empirical, and has not been based on scientific and technical investigations. Among many producers of electrical apparatus there exists a diversity of opinion as to the chemical and physical characteristics of the molded resinoid materials. The lack of definite knowledge as to their properties also has caused a certain amount of prejudice against the molded materials,—entirely without foundation.

Official Methods Inadequate

This is at least partially due to the fact that the official testing methods, such as those of the Verein Deutscher Ingenieure, are based purely on strength tests, devised for the purpose of classification. These tests are made on special test pieces or rods, but provide data only on the breaking strength, electrical resistance and the like, without giving any information as to the behavior of the molded finished objects when subjected to severe service conditions.

This important contribution to the knowledge of the behavior of the resinoid molded materials under the influence of a constantly applied electrical current while exposed to various chemicals and vapors, is taken, with express permission, from the private publication (in German), entitled "Kontakt-Rommler-Nachrichten", published by the recently merged Kontakt A.-G and the H. Rommler A. G., two of the largest German producers of electrical insulation and apparatus.

The article deals with tests made on finished pieces of molded electrical insulation which were exposed to ammonia vapors, hydrochloric acid vapors and the ammonium chloride resulting from the admixture of these gasses. The molded materials were also compared with metallic parts at the same time, as well as with ceramic products.

Quite obviously the results of such tests leave much to be desired.

It was therefore of fundamental importance to ascertain how the molded resinoid objects would act when subjected to various strong chemicals while at the same time being part of an electrical apparatus in which they performed both the function of supports as well as insulators. Powerfully acting chemical vapors were used to perform the tests, as it is quite obvious that no electrical circuits would ordinarily be used in a chemical liquid. Distinct observations were made on objects supplied with direct current as well as those supplied with alternating current, as the former, due to electrolytic effects, acts quite differently from the latter.

Testing Chambers

The tests were carried out in chambers especially built for the purpose, as illustrated in Fig. 1. These chambers were isolated from each other. In the lower portions of the same there were vessels filled with the following chemicals:

Chamber 1: Concentrated (23. 60% ammonia

Chamber 2: 10% ammonia

Chamber 3: 10% ammonia and 10% hydorchloric acid

Chamber 4: 10% hydrochloric acid

Chamber 5: Concentrated hydrochloric acid (36.9%)

The reasons for choosing the above reagents are as follows:

(a). Hydrochloric acid is the only practical available acid that is readily volatile, and is also actually encountered in many factories and locations.

(b). Ammonia is the only practically available volatile base and exists freely in many stables and other places where organic materials are undergoing decomposition.

(c). In chamber No. 3 ammonium chloride formed from the vapors arising from the ammonia and from the hydrochloric acid.

The concentration of the vapors is obvious from the above description. It must be admitted that the tests were extremely severe, and were made with concentrations of the reagents as they will probably never be actually found in practice, but the purpose of the tests was to provide rapidly information from which definite conclusions could be drawn. It was almost impossible to remain near the chambers when they were opened for inspection.

It should also not be forgotten that these tests were additionally severe due to the fact that the materials were also simultaneously subjected to the effects of an applied voltage, both direct as well as of alternating current. Thus electrolytic action, and the formation of the corresponding anions and cathions added to the severity of the testing conditions.

Severity of the Tests

Fig. 2 shows the method of installing the various types of molded electrical apparatus and the comparative devices also subjected to the tests. Each chamber was provided with two boards lined with lead foil. On these boards there were mounted various types of insulation, both of the so-called weather proof as well as of the indoor types. The following devices were provided (see illustration):

a. Switch

b. c and d, contact-plugs

e. oil-filled switch actuated by a rod

f. 6-ampere single switch

g. 6-amp. single contact socket

h. electric light socket

i. distributing device as used in wet rooms

j. k. l. and m. test rods

The above installation was selected in order to ascertain whether the completely airtight

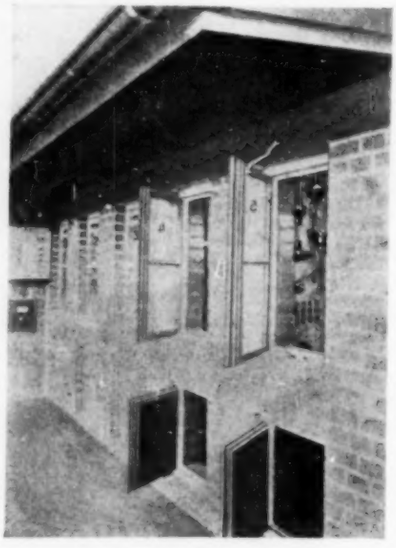


Fig. 1—General view of the testing chambers.

apparatuses were more resistant to destruction than the open type of apparatus; as well as to determine the advantages or disadvantages of the various kinds of switches etc., when subjected to the same conditions.

The test pieces consisted of insulation made by the H. Rommler A.-G. of Spremberg, Germany, known respectively as Hares C special,, Hares C Special F, Heliosite B and Resistan red-brown. These pieces of insulating rod were provided also with contact pieces, so arranged that the distance between the live contacts could be varied. One group of insulating material in each chamber was supplied with direct current, and the other with alternating current, the latter being 220 volts while the direct current was 110 volts. In both installations the supply was bi-polar. The lead foils covering the mounting boards were grounded so that not only breakdown between the various pieces but also leakages to ground could be detected. The test pieces were also subjected to the electric current, as the clamps holding them were alive.

The test chambers were placed in service on November 7th, 1928, and were examined every day. The results were as follows:

Results

In chamber No. 5, which contained concentrated hydrochloric acid, the development of vapors was so severe that on the open test pieces sufficient moisture accumulated to produce arcing between the metallic supporting pieces, despite the fact that these were from 3 to 4 millimeters apart. For this reason these test pieces were subjected to the electrical conditions for only four weeks of the entire test period.

Two days after the beginning of the test, in chambers 1, 2 and 3, the action of the ammonia vapors on the metallic parts was plainly evidenced by the fact that all of the brass parts were coated with a green and blue deposit; quite obviously having been severely attacked by the chemical vapors.

After five days the insulation resistance of the entire installation (i. e. the five chambers in series) was determined and found to be 220,000 Ohms for alternating current and 500,000 ohms for direct current. These values are far below what is required, as similar installations are supposed to have a resistance of around 2 million ohms. This lowering of the resistance at so early a stage can be safely ascribed to the presence of large amounts of moisture due to condensation as the result of the presence of the acid and alkali vapors.

It was found that by aerating the chambers for 24 hours that the insulating value of the insulation would again be as high as 100 million ohms, thereby proving that the lowered resistance was not due to any de-

struction of the resinoid molded material but due to the presence of electrolytes. The same effect is produced when using purely ceramic insulation, as will be pointed out further on in this article.

The action of the ammonia vapors on the metallic parts became strongly evident in five days. At several places the contact fingers of the connectors were completely destroyed and had broken off. On the single throw switches and contactors for indoor use the metallic parts were severely attacked, and in some cases completely distintegrated. In the chambers that were subjected to the acid vapors the brass parts showed black spots.

After six weeks of operation the metallic parts of such devices in which the metal parts are freely accessible to the air were badly coroded. In the water-proof apparatus, however, for instance of the type known in Germany as the "Isowag" the metallic parts were entirely unaffected.

After two months of operation, namely on January 10, 1929, it was determined that all of the parts made from molded resinoid material had remained entirely unaffected. Those that were subjected to the ammonia vapors had even preserved their original lustre, thus proving that they had not been influenced as to their chemical properties at all.

Deductions

One practical deduction that can be drawn from this, is that for farm installations, stables etc., where ammonia is in the air, such molded resinoid insulation is perfectly safe and permanent. The parts that had been subjected to the concentrated hydrochloric acid vapors were slightly dulled in appearance, but after being dried off still had a resistance of about 35,000 million ohms. The same insulating value was found for the other insulation materials.

It is of particular interest to notice, at this point, that one of the switch handles, made from a ceramic material was almost completely destroyed as to its surface by the hydrochloric acid vapors. It was so soft that it could readily be scratched by the finger nail.

The cementing material in the electric light sockets was attacked by the ammonia and was colored blue thereby. The entire metallic parts of those apparatuses in which the metallic parts were subjected to the vapors had been completely destroyed, whilst in the water-proof and gasproof apparatus, in which the metallic parts were protected by a housing of resinoid molded insulation, the metallic parts were completely intact.

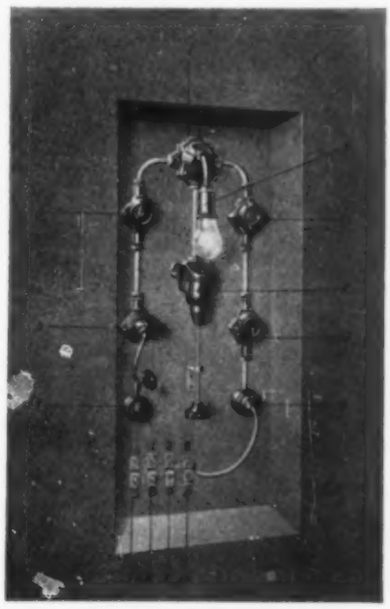


Fig. 2—Inside of the testing chamber.

In the case of the distributor, the molded cover had fallen off, by reason of the fact that the metallic screws that held it in place had been eaten away. It is interesting to note that even in the "Isowag" type of contactors, in which of course the air can not be excluded as the openings through which the contact fingers engage the interior parts must be open at all times, the interior metallic parts, at least of those subjected to ammonia vapors, were severely attacked. This shows that for apparatus that is subject to ammonia vapors, it is absolutely essential that the metallic parts be completely shielded by molded insulation.

It should also be mentioned that the apparatus subjected to direct current was more deleteriously affected than the apparatus subjected to the alternating current. This could have been expected.

Action on Metal

The action of the various vapors on the metallic parts was as follows:

1. Ammonia vapors. The brass and copper parts are rapidly destroyed, even the thicker pieces being deeply affected.

2. Hydrochloric acid vapors. In this case the brass is but slightly affected, the action being confined to the surfaces where there are black spots in evidence. Copper, however, is completely destroyed. Iron in this case is also badly affected and is covered with heavy rust. Covering with zinc, or lacquering, was found to be incapable of preventing this.

It is intended to make a more extended study of the action on the metallic parts. These experiments, which were conducted for the first time, teach the construction engineer in a most unequivocal manner that the molded electrical insulation is completely resistant to very severe atmospheric conditions, be they alkaline or acid in nature, or even if actual salts, such as ammonium chloride are present.

As these experiments are quite new and were carried out for the first time, it is obvious that the results, especially for first two months, were more qualitative than quantitative. They do show, however, that molded resinoid insulation will safely withstand the conditions. It is intended to extend this investigation also to the other, non-resinoid, insulating materials such as the ceramic, porcelain etc. More definitive quantitative data is also to be obtained.

The World's Recent Progress in Synthetic Resins

A complete and condensed account of patents from the most important industrial countries

By Dr. Aladin

The patents that are listed here are all of recent origin and disclose the progress realized throughout the civilized world in this field. The dates, except in case of U. S. patents, are those of application. There will be a total of over 450 patents in this review. Publication began in April, 1929.

(Continued from December Issue)

II. RESINS FROM HYDROCARBONS

a. Cumarone Resins

Serial No.	Patent Number and Date	Inventor or Assignee	Title of Invention	Subject Matter of Invention
215	U. S. P. 1,684,868	Koppers Co. (J. H. Jones)	Preparation of Resins.	Solvent naphtha having a boiling point of between 145° and 205° C., and containing cumarone and indene, properly purified is treated with concentrated sulfuric acid to polymerize the cumarone and indene, which are separated, washed with alkalies, and then distilled in vacuo, providing a resin suitable for preparing lacquers.
216	Ger. P. 319,011	Deutsch-Luxemburgische Bergwerk A.-G. und S. Hilpert	Preparing light colored resin solutions.	The waste acid from the purification of solvent naphtha is diluted with water, precautions being taken to avoid rises in temperatures that would lead to carbonization. The resins thus caused to separate from the acid are taken up with one of the benzenoid hydrocarbons, and the resultant solution separated from the dilute sulfuric acid. The solutions may be used directly, or the resin recovered in powdered form from the solution by distilling the latter. The resins, in conjunction with cumarone resins, yield good lacquers.
217	Ger. P. 363,291	A. Krieger	Preparing a fluid cumarone resin suitable as a lubricant.	Crude benzene boiling between 80.5° and 160° C. is treated in the usual manner with sulfuric acid, then is washed with water, neutralized, again washed to remove any sulfonic acids that might still be present, and is then distilled together with an alkali such as soda, whereby the cumarone resin distills over as a brown, practically ash-less liquid.
218	Ger. P. 446,707 Frdl. XV., 1245	Interessen Gemeinschaft Farbenindustrie A.-G.	Obtaining high-melting cumarone resins.	Low-boiling anthracite-coal distillates, without heating, are treated with small amounts of metallic salts that are capable of exerting a polymerizing action, the mixture being agitated. Aluminum chloride and iron chloride will serve the purpose.
219	Ger. P. 454,307 Frdl. XV, 1927	Zeche de Wendel (E. Kugel and H. Schmaike)	Obtaining valuable resins from hydrocarbons recovered from acids used in purifying benzene by their neutralization with ammonia.	The neutralization of the purifying-acid is effected in the presence of a solvent such as benzene or solvent-naphtha, while agitating and cooling the mixture. The resultant solution of resin is separated from the ammonium sulfate (i. e. when ammonium hydroxide has been used as the alkali), and is distilled to recover the resin.

Serial No.	Patent Number and Date	Inventor or Assignee	Title of Invention	Subject Matter of Invention
220	French P. 644,015	Interessen Gemeinschaft Farbenindustrie A.-G.	Preparation of artificial resins.	Crude solvent naphtha that has been freed from alkaline substances is, with or without the addition of phenols, treated with from 10 to 15% of ferric chloride at temperatures not exceeding 50°C, while stirring. Then xylene or purified solvent-naphtha is added and the stirring continued at from 90 to 95°C. After the usual working up of the product, one obtains a cumarone resin having a melting point of 150°C.

b. Resins from Vinyl Compounds

221	U. S. P. 1,586,803	E. Baum and W. O. Herrmann; (to Konsortium für elektrochemische Industrie)	Polymerization of vinyl compounds.	See German Patent 431,146 (No. 222).
222	Ger. P. 431,146 Frdl. XV, 1137	E. Baum and W. O. Herrmann; (to Konsortium für elektrochemische Industrie)	Polymerization of vinyl compounds.	The vinyl compounds are heated under pressure with peroxides and water; if desired hydrogen dioxide may also be present.
223	Ger. P. 446,562 Frdl. XV, 1258	W. Haehnel and W. O. Herrmann; to Konsortium für elektrochemische Industrie	Preparation of vinyl acetate polymers soluble in benzene, alcohol, etc.; and lacquers made therefrom.	Vinyl acetate is polymerized to the stage in which it is soluble in alcohol, benzene, etc., preferably in the presence of the said solvents.
224	Ger. P. 449,115	Interessengemeinschaft Farbenindustrie A.-G., (R. Leopold and A. Michael)	Preparing alcohol-soluble resins.	Vinyl esters are heated under pressure in the presence of aliphatic aldehydes.
225	Brit. P. 255,837	I. Ostromislenski	Polymerization products of vinyl chloride.	Vinyl chloride, in the gaseous phase, or while dissolved in organic solvents, is treated with sunlight or ultraviolet light. The resulting polymers are separated from the product by treatment with successive portions of acetone and chlorobenzene.
226	British P. 261,406	Consortium für elektrochemische Industrie	Polymerization of Vinyl Esters.	See French Patent 624,493.
227	French P. 624,493	Consortium für elektrochemische Industrie	Polymerization of Vinyl Esters.	The polymerization takes place in two stages. Small quantities only are treated at any one time, and vinyl acetate, for example, is oxidized with about 1% of benzyl-peroxide. The reaction is then completed in a larger kettle. By adding some butyl acetate, a glass-clear resin is obtained. (See also German Patent 446,562; No. 223.)
228	French P. 634,136	Consortium für elektrochemische Industrie	Preparation of an adhesive and impregnating material.	Condensation products of vinyl acetate are used either in the liquid state, or in solution, as a lacquer.
229	French P. 640,364	Carbide and Carbon Chemical Corporation	Lacquer.	Polymerized vinyl esters are employed as additions to regular cellulose nitrate lacquers.

Other Similar Resins

230	U. S. P. 1,570,469	E. Freund and H. Jordan (assgrs. to Chem. Fabrikauf Aktien vorm. E. Schering	Preparation of artificial resins.	Aromatic hydrocarbons or phenols are condensed with organic halogen compounds in the presence of such surface-catalysts as fullers earth. When working with naphthalene and naphthalene-tetrachloride, using about 0.1% of fullers earth, a hard resin is obtained.

Serial No.	Patent Number and Date	Inventor or Assignee	Title of Invention	Subject Matter of Invention
231	German P. 446,999 Frdl. XV, 1178	H. Schirmacher and A. Voss (I. G. Farbenindustrie A. G.)	Preparation of condensation products.	The condensation products derived from aralykylhalogenides and aromatic hydrocarbons or their homologs are treated with formaldehyde or with substances capable of splitting off such aldehydes. For example the oily product resulting from the treatment of benzyl chloride and xylene with zinc chloride is subjected to the action of paraformaldehyde dissolved in glacial acetic acid with addition of zinc chloride. A highly viscous oily product will result. It is useful as a plasticizer and softener for lacquers.
232	Swiss P. 121817	H. Standinger	Hydrogenation of polyindines.	Polyindines are treated, in presence of a nickel catalyst, first at low temperatures, and finally at temperatures as high as 250 to 275° C., under pressure, with hydrogen, to form hydrogenated products suitable for making lacquers.

III. Resins from Hydrocarbons and Aldehydes.

IV. Resins from chlorine compounds by splitting off chlorine.

V. Resins from naphthalene and benzyl chloride.

VI. Resins from naphthalene and oxalic acid, etc.

No patents to be reported in the above four groups.

VII. RESINS CONTAINING SULFUR

a. from Aromatic Hydrocarbons

233	U. S. P. 1,671,228	O. A. Cherry (Cutler-Hammer Mfg. Co.)	Manufacture of sound records.	An artificial resin is obtained by heating 100 parts of naphthalene with from 100 to 150 parts of sulfur chloride using a small amount of iron or similar catalytic material; finally sulphur and ozokerite are added, some filler incorporated with the resultant mixture, and the product molded under pressure.
234	U. S. P. 1,682,913	F. E. Layman and O. A. Cherry (Cutler-Hammer Mfg. Co.)	Sound records.	A mixture of 10 parts of an artificial resin obtained from naphthalene by the action of sulfur chloride and sulfur (or similar products from phenols instead of the naphthalene); and 1 part of white lead, is heated to over 300° C.
235	Ger. P. 410,012	Farbwerke Höchst (G. Balle)	Preparation of high-melting, hard pitchy masses from acid resins.	Pitch-like products of high melting point are obtained by treating acid-resin with sulfur chloride, either in presence or absence of condensing agents.
236	Ger. P. 427,607	I. G. Farbenindustrie A. G. (G. Balle)	Preparation of sulfur-containing resinous condensation products from aromatic amines.	See also the main patent German 410,012 (No. 235). According to the present improvement, the resin obtained from acid-resin by action thereon of sulfur chloride is further treated with aromatic bases.

b. From Aromatic Amines

237	U. S. P. 1,654,856	A. Blumenfeldt and H. Kalgi (Ges. für Chem. Industrie)	Preparation of sulfur-containing resinous condensation products from aromatic amines.	Aromatic amines (with the exception of para-toluidine or of alkylated anilines) are heated with considerable quantities of sulfur in presence or absence of a catalysts, specifically of iodine. Hard resins are obtained. Their solubility characteristics differ according to the precise method of operation.

(*See page 21*)

Serial No.	Patent Number and Date	Inventor or Assignee	Title of Invention	Subject Matter of Invention
238	Brit. P. 214,242	Ges. für Chem. Industrie	Preparation of sulfur-containing resinous condensation products from aromatic amines.	See U. S. P. 1,654,856 (No. 237.)
239	French P. 578,444	Ges. für Chem. Industrie	Preparation of sulfur-containing resinous condensation products from aromatic amines.	See U. S. P. 1,654,856 (No. 257).

VIII. Resins from Ketones, Ketone-alcohols, etc.

IX. Resins from Ketones and Aldehydes.

There are no patents to be reported in the above two groups.

This compilation of the resinoid patented art continues in our next issue with the Resins from aldehydes, and from furfural etc. There will be a total of over 400 patents in this review.

The Cellulose Acetate Plastics

Progress in the art of non-flammable and molded products is reflected best in the patented art, where all real research contributions are laid down

By Joseph Rossman

THE story of the widespread use and commercial success of celluloid forms one of the most interesting chapters in the history of modern chemistry. There are few synthetic materials to-day that can compare with the industrial versatility and applicability of celluloid. It was soon found however that celluloid could not be used safely where it was likely to be exposed to high temperatures. A feverish search was then begun to find a plastic material that would have all the advantages and desirable properties of celluloid and yet be uninflammable. The result of this search was the cellulose acetate plastics.

The author's name, in view of his many contributions along the line of comprehensive patent reviews in this and other journals, is a sufficient guaranty of the completeness and accuracy of these concise abstracts of an active and important branch of the plastic art.

The Beginnings

The earliest attempts consisted in mixing cellulose nitrates with cellulose acetate so as to form a uninflammable plastic as shown in U. S. patent No. 729,990 dated June 2, 1903 to Zuhl.

Most of the patents for cellulose acetate plastics have been issued during the last few years. Attempts however have been made over twenty-five years ago to make cellulose acetate plastic. The patent No. 738,533 dated Sept. 8, 1903 to Eichengrun for instance proceeds as follows: A mixture of one hundred parts of acetylized cellulose (obtained by the action of acetic anhydrid and sulfuric acid on cellulose at ordinary temperature) and fifty parts of camphor is triturated with chloroform or glacial acetic acid. After some hours and on gently heating the solid parts will be dissolved. On evaporating the liquid substance remains in the shape of a translucid uncolored flexible mass burning slowly, which can easily be worked by rollers while still hot. Of course instead of camphor other bodies can be used which impart plasticity to the mixture, such as paratoluene sulfamid, the methylic ester of paratoluene sulfonic acid, naphthalene, the methylic ester of oxalic or phthalic acid, or the like.

Solvents for Cellulose Acetate

The utilization of cellulose acetate in plastics depends on the discovery of suitable solvents for this substance. There are two classes of solvents; liquid solvents, of which wood spirit is a good example for nitro cellulose, and solid solvents, of which camphor is a good representative for nitro cellulose. Solvent mixtures are also formed by combining two or more substances with each other; the components of the mixed solvent in such a case may not necessarily be possess-

ed of individual solvent power. For instance, alcohol, which is practically a non-solvent in itself, forms a good solvent mixture for nitro cellulose when camphor is dissolved in it; ethyl alcohol and ether form a solvent of nitro cellulose, while neither is a solvent by itself. Methyl alcohol will dissolve nitro cellulose, but is not a solvent by itself of acetyl cellulose. The various applications of cellulose acetate require the use of complex mixtures in the solvent, single substances being rarely used for such purposes. Hence, while the advancement of the art has, as is well known depended largely on the discovery and application of new single solvent substances, yet it has required also the invention of combinations of solvents by which effects are produced quite different from those produced when single solvents are employed alone.

Lindsay's Work

For instance, in patent No. 1,027,486 dated May 28, 1912 to William A. Lindsay who is one of the most active workers in this field the solvent power of acetodichlorhydrin for acetyl cellulose is greatly increased by the use of an alcohol such as ethyl or methyl alcohol. As an example one part of acetyl cellulose (by weight) is dissolved in a mixture consisting of three parts of acetodichlorhydrin (by volume) and two parts methyl alcohol (by volume). Such a mixture is suitable for the manufacture of films or sheets by evaporation, and if a massive product is desired the evaporation may be promoted by kneading the mass on rolls.

Camphor Substitutes

It has long been known that camphor mixed with nitrocellulose upon the addition of ethyl alcohol to the mixture becomes a solvent of the nitrocellulose. When that process is applied to acetyl cellulose no solvent action takes place in the cold. It was therefore necessary to find substances which, when added to the acetyl cellulose would, upon the subsequent addition of ethyl alcohol, exert a solvent action upon the cellulose and produce a plastic mass which could be worked in a manner analogous to nitrocellulose camphor compounds.

Not all of the so-called camphor substitutes possess this property when used with acetyl cellulose. According to Lindsay U. S. patent No. 1,041,113 dated Oct. 15, 1912 camphor substitutes may be grouped into three classes with respect to their solvent action on acetyl cellulose, namely:

Class A: Those substances which are non-solvents when melted, or when dissolved in either ethyl or methyl alcohol in the cold, or room temperature; such as triphenylphosphate, tricresylphosphate, and naphthalene.

Class B: Those substances which become solvent when melted, but are non-solvents when dissolved in ethyl alcohol at room temperature; such as camphor, tetra-chlor-ethyl acetanilid, and trichlormethyl acetanilid.

Class C: Such substances as become solvents when melted and also become solvents when dissolved in methyl or ethyl alcohol in equal parts by weight at room temperature; such as toluol-sulphonamid, benzene-sulphonamid, ethyl acetanilid, and methyl acentanilid.

Some Details

The following example illustrates the method of carrying out the process: 100 parts of an acetyl cellulose which is soluble in acetone are mixed with 20 to 50 parts of ethyl para toluol-sulphonamid by suitable grinding and mixing, as is the practice in the nitrocellulose art. To such mixture add from 40 to 100 parts of ethyl or of methyl alcohol, or a mixture of the two, and after thorough incorporation by stirring, the mixture is allowed to remain at room temperature in a closed vessel for from 5 to 24 hours, or longer, the length of time depending upon the physical form of the acetyl cellulose used; that is, whether it is finely or coarsely ground. In the course of time the mixture will have become converted into a more or less stiff gelatinated mass. It can then be worked up on rolls or a kneading machine, according to the practice which is common in the nitrocellulose-camphor plastic art, and the resulting product may then be molded or passed through the stuffing machine as in the case of nitrocellulose-camphor compounds.

The Use of Triphenylphosphate

Triphenylphosphate can be combined with acetyl cellulose to produce a non-inflammable compound having great strength and tenacity, and other valuable properties.

In carrying out the process of patent No. 1,050,065 dated Jan. 7, 1913 to Lindsay an acetyl-cellulose is dissolved in a solvent which is also a solvent of triphenylphosphate and to this solution is added triphenyl-phosphate, either in solid form or previously dissolved in acetone or other suitable solvent. The amount of triphenylphosphate may be varied in proportions from ten to twenty parts by weight to each one hundred parts of the acetyl cellulose, and the acetone or other suitable solvent is added in sufficient quantity to make either a flowable solution or a plastic mass. The resulting mixture is suitably manipulated to permit a portion of the solvent to evaporate.

The addition of 1½% urea will insure permanency of strength and tenacity to the compound. The proportion of urea or equivalent substance will vary according to the desired degree of stability of final product. A proportion of two parts urea to one hundred parts of the cellulose compound gives excellent results.

The product can be made in the form of films or thin sheets. Any approved method of forming films or thin sheets from a flowable solution may be employed. The final product may also be made in the form of a mass of any desired thickness. It will be obvious that suitable

(*Continued on page 28*)

Actual and Proposed Syntheses of Phenol

Production of one of the fundamentally important raw materials for the manufacture of the resinoids

By Isadore S. Melanoff, M. Sc.

THE synthesis of phenol, as commonly known, starts with the sulfonation of benzene, with the conversion to an alkali phenolate and the final liberation of phenol with acid. The next step which delves further into the synthesis of phenol is the one where halogen derivatives of benzene are used. Other processes, less commonly known are first: Those oils from low-temperature distillates of coal, which are hydrogenated in the presence of a catalyst; second, benzene in the form of vapor is converted to phenol in a heated chamber and in the presence of air; third, benzene is converted to phenol by heating under pressure with an alkali and a catalyst; fourth, a method which makes use of crude tar acids. In the following I have attempted a brief survey of this field.

U. S. Patent No. 1,179,415. C. Ellis (1916). The invention relates to the treatment of sulfonic acid derivatives of benzol, toluol, naphthalene and the like. To form the mono-sulfonic acid of benzol, an excess of 66° or 98% of sulfuric acid is employed at the beginning and after a time fuming sulfuric acid is added to complete sulfonation. The amount of fuming sulfuric acid employed should be about one third by volume of total acid used. The above acid material is next treated with a concentrated solution of sodium sulfate or a mixture of sodium sulfate and sulfite. Sodium benzene sulfonate and sodium bisulfate are formed and the former is salted out and then fused with caustic soda. The melt is cooled and dissolved in as small an amount of water as possible and then acidified.

The tremendous increase in the manufacture of synthetic resins of the phenol-aldehyde type makes it appear highly probable that resort must again be had to the production of synthetic phenol, as was the case during the World War.

Large users of phenol are faced with a possible shortage or rise in price of this important chemical; hence the present article is particularly timely.

The reactions involved are:—

$C_6H_5SO_3H + H_2SO_4 + 2Na_2SO_4 — C_6H_5SO_3Na + 3NaHSO_4$

$2C_6H_5SO_3Na + 4NaOH — 2C_6H_5ONa + Na_2SO_3 + Na_2SO_4 + H_2O$

$C_6H_5ONa + NaHSO_4 — C_6H_5OH + Na_2SO_4$.

U. S. Patent No. 1,191,880. C. Ellis (1916). This patent differs from patent No. 1,179,415, by sulfonating the benzol with a slight excess of acid and using sufficient fuming sulfuric acid to complete sulfonation. The excess acid may be removed by sodium sulfate or with sodium carbonate or carbon dioxide gas.

U. S. Patent No. 1,210,726. D. Tyrer (1917). The hot mixture of acid from the sulfonation pot (containing benzene-sulfonic acid, sulfuric acid and water) is transferred to a tank containing water and the required amount of calcium carbonate (limestone).

(Stage 1)

$C_6H_5SO_3H + CaCO_3 — [C_6H_5SO_3]_2Ca + CO_2 + H_2O$

$H_2SO_4 + CaCO_3 — CaSO_4 + CO_2 + H_2O$.

In place of limestone a mixture of calcium carbonate and calcium sulfite obtained as a by-product in state 5, may be used.

$2C_6H_5SO_3H + CaSO_3 — [C_6H_5SO_3]_2Ca + SO_2 + H_2O$

(Stage 2). The liquid containing calcium benzenesulfonate in solution and calcium sulfate in suspension is next added to a solution of sodium sulfate.

$[C_6H_5SO_3]_2Ca + Na_2SO_4 — 2C_6H_5SO_3Na + CaSO_4$

(Stage 3). The liquid is filtered and to it is added a solution of sodium hydroxide and heat until the mixture fuses.

$C_6H_5SO_3Na + 2NaOH — C_6H_5ONa + Na_2SO_3 + H_2O$

(Stage 4). The melt is dissolved in water and the gases CO_2 and SO_2 from stage 1 is passed through the solution.

$2C_6H_5ONa + CO_2 + H_2O — 2C_6H_5OH + Na_2CO_3$

$2C_6H_5ONa + SO_2 + H_2O — 2C_6H_5OH + Na_2SO_3$

$2NaOH + CO_2 — Na_2CO_3 + H_2O$

$2NaOH + SO_2 — Na_2SO_3 + H_2O$

(Stage 5). TheNa_2CO_3 and Na_2SO_3 is then boiled with milk of lime to produce the $CaCO_3$ and $CaSO_3$ and liberate caustic soda.

U. S. Patent No. 1,212,612. L. M. Dennis (1917). This patent treats the mixture of benzene sulfonic acid with benzene which dissolves the benzene sulfonic acid and not the sulfuric acid. The benzene solution is brought into contact with an aqueous solution of sodium hydroxide, whereupon sodium benzene sulfonate separates out in solid form.

(*Continued on page 30*)

Technical Abstract Section

A Concise Review of Patents and Literature

Phenolic Resin Composition. U. S. P. 1,695,566; Dec. 18, 1928. Victor H. Turkington, assignor to Bakelite Corporation.

Dibutyl phthalate is used as a softener for phenol resins used as a varnish base.

Plastic Resinous Material. U. S. P. 1,692,524; Nov. 20, 1928. Harry M. Weber, assignor to Ellis-Foster Company.

As an illustration of the preferred method of preparing molding composition the following is given. 90 parts formaldehyde, 40 percent solution, was ground with 20 parts of magnesium oxide in a pebble mill for 2 hours. The ground mixture was then added to 100 parts metaparacresol and the mixture heated for 20 minutes maintaining the temperature at 70° C. An exothermic reaction took place and it was necessary to cool the mixture through most of the heating period. The resinous solution was placed in a vacuum dryer and evaporated under 28 inches vacuum until the temperature of the resinous mass reached 70° C. The hot viscous resinous material was then mixed with an equal weight of wood flour in a Werner-Pfleiderer mixer for one hour or until the particles of the wood flour had been thoroughly coated with the resin. A small quantity of moisture remained in the composition and this was removed by allowing the composition to stand exposed to the dry air at room temperature for 12 hours. The composition molded successfully at a press temperature of 160° C. flowing freely, curing to a thermo-rigid body within 5 minutes and forming a good fin.

Method of Insulating Conductors. U. S. P. 1,689,312; Oct. 30, 1928. Robert R. Williams, assignor to Western Electric Company.

To provide an insulated conductor having the desired characteristics, the invention contemplates the use of an insulating compound which is first vulcanized then rendered plastic and extruded in a continuous sheath about the conductor by means of heat and pressure.

The accompanying drawing is a sectional view of an extruding press by means of which the plastic mass of prevulcanized rubber is extruded about the conductor.

Plastic Resinous Material. U. S. P. 1,692,524; Nov. 20, 1928. Harry M. Weber, assignor to Ellis-Foster Company.

As an illustration of the preferred method of preparing molding composition the following is given. 90 parts formaldehyde, 40 percent solution, was ground with 20 parts of magnesium oxide in a pebble mill for 2 hours. The ground mixture was then added to 100 parts metaparacresol and the mixture heated for 20 minutes maintaining the temperature at 70° C. An exothermic reaction took place and it was necessary to cool the mixture through most of the heating period. The resinous solution was placed in a vacuum dryer and evaporated under 28 inches vacuum until the temperature of the resinous mass reached 70° C. The hot viscous resinous material was then mixed with an equal weight of wood flour in a Werner-Pfleiderer mixer for one hour or until the particles of the wood flour had been thoroughly coated with the resin. A small quantity of moisture remained in the composition and this was removed by allowing the composition to stand exposed to the dry air at room temperature for 12 hours. The composition molded successfully at a press temperature of 160° C. following freely, curing to a thermo-rigid body within 5 minutes and forming a good fin.

Process of Treating Cellulosic Material. U. S. P. 1,711,110; Apr. 30, 1929. Henry Dreyfus, of London, England.

Example 1.

100 parts by weight of sulphite pulp, soda pulp, sulphate pulp or like wood pulp are boiled for about one to two hours under atmospheric pressure with a solution of caustic soda of ¼ to 2½% strength in a proportion of about 20-30 times weight of liquid relatively to the weight of pulp

Production of Acetyl Cellulose Soluble in Chloroform. U. S. P. 1,711,314; Apr. 30, 1929. Wolfgang Gruber, assignor to Dr. Alexander Wacker Gesellschaft Fur Elektrochemische Industrie, Munich, Germany.

Ex. I.—100 kilos of zinc chloride are dissolved in 300 kilos of acetic acid and 400 kilos of acetic anhydride. Thereupon 100 kilos of cellulose such as cotton paper are added and the mass heated quickly to 55° C. and kept at this temperature until the cotton fibres have lost their structure. This generally occurs within ½ an hour and then the acetylization is continued at a temperature below 40° C. for 3 or 4 hours. By this time the solubility of the acetylization products in tetrachlorethane or chloroform will be found to be complete. After this, the separation and treatment of the acetyl cellulose may be effected in any well known manner.

Making Cellulose Esters of High Uniformity. U. S. P. 1,711,940; May 7, 1929. Harry Le B. Gray, assignor to Eastman Kodak Co.

4. In the process of making cellulose acetate, the steps of subjecting the cellulosic fibers to be acetylated to a vacuum, mingling with said fibers, while a vacuum is maintained, the quantity of acetylating liquid, including acetic anhydrid, which is to be present during the acetylation, breaking the vacuum when air bubbles substantially cease to evolve from the mixture and thereafter conducting the acetylation reaction.

Increasing the Uniformity of Cellulose Esters. U. S. P. 1,711,941; May 7, 1929. Harry Le B. Gray, assignor to Eastman Kodak Co.

2. The method of making cellulose esters of organic acids which comprises the steps of placing the cellulosic fibers to be esterified under a vacuum, thoroughly mixing said fibers while maintaining a vacuum, with an inert volatile organic liquid vehicle having dissolved therein the amount of acylating agent for the reaction and also carrying a catalyst, evaporating said vehicle under vacuum from the mixture, thereby leaving said agent and satalyst uniformly distributed throughout said fibers, breaking the vacuum and conducting the esterification reaction.

Stencil Sheet Containing Phenolic Resins and Pyroxylin. Shinjiro Horii, Tokyo, Japan. U. S. P. 1,698,705; Jan. 8, 1929.

5. In the process of making a cel-

1. In a stencil sheet, the combination with a base of fibrous material, of an impregnating composition comprising resin, esters of polysaccharides and a tempering agent.

Cellulose nitrate, 5% solution	100
Stearine	10
Castor oil	20
Phenolic resin, 20% solution	200

Method of Manufacturing Sheets, Slabs or Molded Articles from Celluloid or Celluloidlike Materials. U. S. P. 1,716,379; June 11, 1929. Gustav Leysieffer, of Troisdorf, Germany.

A method of manufacturing sheets, slabs and molded articles from celluloid and celluloid-like materials consisting of the steps of preparing relatively thin sheets from a relatively larger portion of the same material containing solvent which was present during the formation thereof, removing enough of said solvent from said relatively thin sheets to prevent welding of the same under normal conditions of temperature and pressure but leaving sufficient to permit such welding under raised temperature and pressure conditions, then welding together said sheets in such condition under the action of raised pressure and temperature to form sheets, slabs and molded articles of any desired thickness but containing very little solvent, and finally removing any residual solvent by drying for a short time at a high temperature.

Phthalic-Glyceride Resin. U. S. P. 1,715,688; June 4, 1929. Henry C. P. Weber, assignor to Westinghouse Electric & Manufacturing Co., a corporation of Penna.

I. A resinous composition of matter comprising a polyhydric aliphatic alcohol-polybasic carboxylic acid compound and a condensation product of a phenolic body and furfural.

2. A resinous composition of matter comprising a polyhydric aliphatic alcohol-polybasic carboxylic acid resin and a condensation product of a phenolic body and furfural.

3. A resinous composition of matter comprising a polyhydric aliphatic alcohol-polybasic carboxylic acid compound and a resin resulting from the condensation of a phenolic body and furfural.

Cellulose-Ether Film. U. S. P. 1,716,418; June 11, 1929. Stewart J. Carrol, assignor to Eastman Kodak Company.

3. A flowable composition comprising 100 parts by weight of water-insoluble ethyl cellulose, 5 to 50 parts of tribromphenol substantially free from uncombined bromine and hydrobromic acid, and more than 300 parts of a volatile common solvent, said composition comprising sufficient inorganic alkali to give it an alkalinity in excess of Ph., the proportions being such that a product formed therefrom will have the properties of high transparencies, freedom from accidental color, inertness toward photographic emulsions and high resistance to heating.

Cellulose Ether Film. U. S. P. 1,716,419; June 11, 1929. Stewart J. Carrol, assignor to Eastman Kodak Company.

3. As an article of manufacture a film comprising colloidized water-insoluble cellulose ether and bromcamphor substantially free from uncombined bromine and hydrobromic acid, said film having distributed therein sufficient inorganic alkali to give the film an alkalinity in excess of Ph_7, the proportions of the ingredients being such that the film is flexible, transparent and inert to photographic emulsions.

Cellulose-Ether Film. U. S. P. 1,716,420; June 11, 1929. Stewart J. Carroll, assignor to Eastman Kodak Company.

2. A composition of matter comprising substantially the following: 100 parts by weight of water insoluble ethyl cellulose, 10 parts of monobrombenzol substantially free from uncombined bromine and hydrobromic acid, and more than 300 parts of a volatile common solvent, said composition comprising sufficient inorganic alkali to give it an alkalinity in excess of Ph_7.

Process of Making Organic Esters of Cellulose. U. S. P. 1,716,422; June 11, 1929. Hans T. Clarke and Carl J. Malm, assignors to Eastman Kodak Company.

1. The process of making organic esters of cellulose which comprises mercerizing cellulosic material with an aqueous alkaline bath, dehydrating it with a substantially anhydrous

neutral organic liquid, and thereafter subjecting the mercerized and dehydrated cellulosic material to the action of an esterifying agent.

2. The process of making organic esters of cellulose which comprises mercerizing the cellulosic material in an aqueous alkaline bath, washing out the alkali with water, removing the water with a substantially anhydrous neutral volatile organic liquid, and thereafter esterifying the mercerized dehydrated cellulosic material with an esterifying bath comprising a fatty acid anhydrid.

Thermoplastic Rubber Composition. U. S. P. 1,716,474; June 11, 1929. Herbert A. Winkelmann, assignor to the B. F. Goodrich Company.

1. The method of utilizing vulcanized scrap rubber in the manufacture of heat-plastic materials which comprises intimately mixing comminuted scrap rubber, crude rubber and pine tar, and reacting on the resulting mixture with an acid reagent adapted to convert it into a heat-plastic material.

White, Clear Ketone-Aldehyde Intermediate and Resinous Complex. U. S. P. 1,716,542; June 11, 1929. Carleton Ellis, Montclair, New Jersey.

The process of making a substantially water white syrupy body which comprises reacting on acetone with formaldehyde in the presence of trisodium phosphate.

The process of making a substantially water white syrupy body which comprises reacting on a lower aliphatic ketone with formaldehyde in the presence of an alkaline phosphate.

Furfural Reaction Product; (non-resinous). U. S. P. 1,716,606; June 11, 1929. Walter O. Snelling, Allentown, Pennsylvania.

It is possible by suitable chemical means to partly withdraw the hydrogen and the oxygen present in the furfural molecule so as to obtain from furfural a charcoal-like product possessing unique and valuable properties, thus obtaining from furfural porous non-resinous products having advantageous properties for the preparation of porous membranes for chemical work and for many other purposes.

The process which comprises admixing furfural, hydrochloric acid and water and allowing the mixture to stand until a solid non-resinous reaction product has resulted.

The process which comprises admixing furfural, hydrochloric acid and water, allowing the mixture to stand until a solid non-resinous reaction product has resulted, and dissolving from such solid non-resinous reaction product water soluble substances therein present.

Cellulose Acetate

(*Continued from page 22*)

pigments or coloring matter may be added to the above mixture or solution to produce a final product for use in imitating other substances, such as amber, ivory, horn, marble, or the like.

Camphor as Solvent

A mixture of ethyl alcohol and camphor is not a solvent of acetyl cellulose in the cold as it is of nitrocellulose, and methyl alcohol by itself is not a solvent of acetyl cellulose as it is of nitrocellulose, yet a mixture of camphor and methyl alcohol in certain proportions will dissolve acetyl cellulose at the ordinary or room temperature.

The method as disclosed in patent No. 1,076,215 dated Oct. 21, 1913 to Lindsay 100 parts of an acetyl cellulose which is soluble in acetone is ground, 25 to 40 parts of camphor so that there is a thorough mixture of the two solid ingredients. From 40 to 60 parts of methyl alcohol is added and stirred until a uniform mixture is produced. The mass is allowed to soak or macerate at room temperature in a closed vessel for from, say, 18 hours to a longer time until gelatinization has taken place. The mass can then be worked in a heated press, or upon rolls, or in a stiffer, as is customary in making nitrocellulose compounds.

Direct Molding of Cellulose Acetate

According to patent No. 1,510,779 dated Oct. 7, 1924 to Herrmann cellulose acetate is first transformed into a finely disintegrated state and exposed to a heavy pressure of about 100-150 atmospheres, at a high temperature which is close to the decomposition point, completely homogeneous pressed masses of great mechanical stability are obtained. The process can be carried out more easily and the strength of the pressed mass can be increased if the cellulose acetate, is not

pure, but is mixed in the disintegrated state with inert filling materials such as for example mineral powders, prior to being pressed.

Plastifying agents or camphor substitutes may be added to the cellulose esters or cellulose acetate in order to reduce the hardness or to impart greater elasticity to the pressed mass.

In carrying out the process the presence of solvents for the cellulose ester or cellulose acetate, such as for instance acetone, or volatile non-solvents, such as benzol, is not required, and even impairs the process when used in large quantities. However small amounts of such volatile substances may be added and also of such substances as for example water, which neither dissolve cellulose acetate nor the plastifying agents or camphor substitute. Also solid substances of a high vapour tension such as naphthalene may be added.

Molded Articles

The process described in patent No. 1,595,506 dated Aug. 10, 1926 to Dreyfus is used for pressed or molded articles produced by pressing under heat, whether in or upon molds or matrices, with or without employment of cores of reinforcements, or on to supports, carriers or backings or into or between sheets or reinforcements of paper, cardboard, wood or other material, or by extrusion through dies or in any other manner.

The process may be used for the manufacture of phonograph records, electrical articles such as switchboards, distributor heads for motor car ignition systems, and so forth.

According to the patent cellulose acetate, is melted together with one or more plasticizing agents in a pot with or without addition of resin or resins for example acaroid resin, rosin, shellac, copal or others and with or without other desired additions, such for example as dyes, pigments, inflammability reducing agents, stabilizers, or in some cases filling materials, and after the melted mass has been allowed to solidify, preferably by running it into sheets, slabs or other convenient form, it is ground to powder, and the

powder, either directly or after working up on heated rolls with or without powdered filling materials, dyes, pigments, inflammability reducing agents, stabilizers or other desired additions, is pressed under heat in molds or matrices, or through dies, or on to or between carriers, backings or the like, or otherwise to form articles or objects of any kind.

In the case of some desired addition, as for example dyes, inflammability reducing agents such as triphenyl or tricresyl phosphate, stabilizers such as alkyl or aryl urea derivatives etc., these may be made to the cellulose derivative containing mixture before the melting, but in the case of additions, such as filling materials, which are usually added in substantial proportions, these should preferably be incorporated or mainly incorporated after the melting and grinding.

Our next issue will contain further portions of this article which concludes with a short resume of over 100 U. S. Patents in this field.

Phenol Syntheses

(*Continued from page 23*)

U. S. Patent No. 1,227,894. L. M. Dennis. (1917). The sodium benzene sulfonate formed in the above invention is fused with sodium hydroxide forming sodium phenolate and sodium sulfite. The former is then treated with an aqueous solution of benzene sulfonic acid forming phenol and sodium benzene sulfonate. The solution of sodium benzene sulfonate is evaporated to dryness and fused with sodium hydroxide.

$C_6H_5SO_3Na + NaOH$ (fused) — $C_6H_5ONa + Na_2SO_3 + H_2O$

$C_6H_5ONa + C_6H_5SO_3H$ — $C_6H_5OH + C_6H_5SO_3Na$

$C_6H_5SO_3Na + 2NaOH$ (fused) — $C_6H_5ONa + Na_2SO_3 + H_2O$

The sodium phenolate formed is again treated with benzene sulfonic acid forming a cyclic process.

U. S. Patent No. 1,320,454. L. M. Dennis. Benzene is sulfonated with fuming sulfuric acid and then extracted with benzene. The benzene sulfonic acid is next extracted with water and neutralized with sodium carbonate or sodium hydroxide. The sodium benzene sulfonate is fused with caustic soda. The mass is dissolved in water and CO_2 passed through the solution.

U. S. Patent No. 1,213,142. J. W. Aylsworth. (1917). Aylsworth treats benzene with sulfuric and fuming sulfuric acid with heat and pressure. The benzene with sulfuric acid is converted into the sodium salt by the addition of sodium sulfite solution, the latter being recovered form succeeding operations. The sodium benzene sulfonate is then treated with an alkali and the phenol finally liberated with acid.

Another method deals with the dissociation of sodium chloride with electrical energy and while the elements are in a nacent state, having them react on benzene. The chlorine produces mono-chlor-benzene, the sodium hydroxide formed, causes the formation of sodium phenolate and the hydrochloric acid causes the final liberation of phenol.

U. S. Patent No. 1,245,343. H. Howard (1917). Sodium bicarbonate is used to liberate phenol from sodium phenolate prepared as usual by caustic fusion of a sulfonic benzene. A sufficient amount of sodium bicarbonate is added to transform all the sodium, whether present as phenolate or as caustic soda associated with phenolate, into normal sodium carbonate.

(To be continued)

MOLDED PRODUCTS

(Reg. U. S. Pat. Off.)

Devoted to the purchase, further use and merchandising of all manner of molded parts

Vol. 4 **JANUARY, 1930** **No. 1**

Battling Generics In Defense of Greater Sales

A Reminder That the Search For More Articles to Be Molded Has Not Ceased

By Nicholas Klein

Editor, Molded Products

IT is a full year since the molding industry, acting through its official organization, has been seeking some expression by which its products may be labeled so as to catch the attention of the buying public. In the broad sense of the word, the molders' customers range from the purchasing agent of the industrial user of molded products to the ultimate consumer —the housewife, for instance— who might buy an ash tray for the home. In the course of the past year, much discussion pro and con and even hundreds of generic names, one practically as good as the other, have been offered as a solution. Several of the materials manufacturers have even been so good as to contribute a sum of money to be awarded to the winner of a prize name contest. Two names have been selected in turn, neither of which met with wide-spread approval. At the end of a year, the atmosphere is not much clearer than it was at the beginning.

Industry's Profits Are Not All They Might Be

And yet the object is worthy of a prompt and complete understanding. To wit: during the past year we have visited the plants of many custom molders. Almost without exception, every one was operating twenty or more hours daily. And yet many—those with whom we have become more familiar—greeted us with the following encouraging remark, 'When do you think we will begin to show a profit'. Rather a bleak outlook for seventy molders whose capital investment runs into millions of dollars, whose purchases of raw materials amount to a few millions annually, and whose finished products are also valued at various millions. Pretty millions, what?

A Circulated Trade Slogan Would Raise Industry's Status

The adoption of a generic name—or better, a trade expression—with its essential broadcasting, will not tend to eradicate the red ink from the molders' ledgers overnight.

It will, however, indicate to a large number of quotation-slicing purchasing agents that they are dealing with an industry of respectable station. Such people will learn that every producer of molded articles feels that molded products, either complete in themselves or as part of an assembled article, have a standing of their own, and a distinct and erect position in relation to other commodities which may also enter into the make-up of such an assembled article.

At an early stage of the generic name game in the molding industry, the range of expression was limited to designate those materials which were permanently set in a mold, under the influence of heat and pressure. The name "Resoid" was chosen and even adopted by the molders' section. This term fitted the limitations of the prize tournament admirably, but during the past few months another material was introduced to the molding industry, on a commercial basis, which went beyond the confines of "Resoid". At least two custom molders are constantly informing their customers that they mold this material, which is not a "Resoid". Thus came about the selection of "Synthoid" which was meant to be an all-inclusive expression of every possible molding material, now known or yet to be developed. As to the reception given this name, we can say no more than refer the reader to the December, 1929 issue of Molded Products.

Molding is the Prime Task of the Molder

Now finally, perhaps, we begin to approach bed-rock. Why should the molder want his product distinguished by a generic name or trade expression? Simply because it is the fundamental purpose of his business existence to encourage the wider

molding of molded products. The nature of the materials he uses does not receive prime consideration. His job is to keep his presses operating. He seeks new articles to *mold* which are possible only by virtue of the methods and materials that are peculiar to the plastic molding industry. He looks for articles to *mold* which were previously fabricated by some other method out of some other material, both of which, in his estimation are inferior to the system of which he is the protagonist. And that system certainly includes molding practise and moldable materials. Taken in this light he feels that he is completely justified in spreading the gospel of 'Have Your Products Molded' or—what have you?

A Service and a Material

In other words, the molding industry's function is, in a broad sense, to sell a service, not a material—and rather a ponderable service. The quality of this service is dependent upon a foundation resulting, often, from many years of experience in the art of plastic molding. Its function is to produce finished parts out of the various moldable materials. Almost always, the design, and frequently, even the die is furnished by the customer placing his order with the custom molder. The customer expects a finished molded article having the characteristics that the material manufacturers have educatd him to expect. Using a specific material is no guarantee that the finished article is according to specifications. Mold construction, curing cycles, the nature of metal inserts, finishing operations and other steps have a decided bearing on the molder's product, as delivered to the customer. In fact, cases have been known where some molder, having attempted to mold in the very dies that another molder used successfully, failed to produce pieces acceptable to the customer. Insufficient experience in some phase of the molding art is generally responsible for such a situation.

The molding industry has a service to sell but this mission is intimately tied up with the sales efforts of the materials manufacturers. This work has been, and continues to be, advanced on a broad scale. The size of the molding industry has been materially influenced by such educational advertising. However closely, though, their task may be tied up with that of the producers of moldable materials, it is still distinct enough and big enough to be carried on under its own banner. May not the theme song be 'Have Your Product Molded'? The material manufacturer may not be keen on going into an explanation of his type of "Synthoid" but he would certainly be in favor of a campaign for more *molded products.*

We do not intend this to be a panacea for all the ills facing the molding industry. We do feel strongly, however, that a generally-usable trade expression, rather than a generic name covering moldable materials, would do much good for an industry that is growing rapidly. Many analogies have been presented in this matter. The case of Kodah was cited as an example of what can be done. PLASTICS and MOLDED PRODUCTS, however, points to 'Save the Surface and You Save All' as the guiding star. That is a slogan that raw material manufacturers, finished material manufacturers, jobbers, retailers and users have united under; all working towards a wider distribution of paint and varnish. In a like manner, the various factors in the plastic molding industry might co-operate toward attaining a similar goal in their own industry.

NEW ELECTRO-DRAULIC PRESS

THERE has been placed on the market a new style of press for the molding of mechanical rubber goods, pyroxylin plastics, casein, fibre and all other synthetic plastics.

This is an absolute mechanical press, electrically driven and electrically controlled by push button, reversing and limit switches. This outstanding feature eliminates the necessity of hydraulic pressure and expensive hydraulic accessories, another step forward in the art of molding. Greater production, less spoilage, lower operating costs, and negligible maintenance costs are a few of the advantages to be gained with the use of this equipment.

The press is unusually easy to operate. The press is started in motion by simply pressing the proper button. When the press has reached the end of the stroke, the motor is automatically stopped by means of a limit switch. The motor is used only to open and close the press. On the pressure stroke, four heavy coil springs are compressed which act as an accumulator and which maintains constant pressure and the desired, "follow-up" necessary in this type of molding. During the cutting period the motor is not running. Pressure and stroke are adjustable from nothing to maximum and the change can be made in five seconds time.

Each press being a complete molding unit, valuable space occupied by pumps and similar equipment may be utilized to better advantage. These presses may be obtained for any tonnage, number of openings, size of platens and stroke.

The press has been developed by the Terkelsen Machine Company and the results obtained in the field have been remarkable. Complete literature on this press is available and may be obtained by writing the above company at Boston, Mass.

Current Importations of Pyroxylin Plastic Materials are Increasing

Sheeting Especially Entering in Large Lots

By A. E. Cameron
Celluloid Corporation

IN May of 1929 the editor of this magazine gave a comprehensive outline of the history of the tariff legislation in relation to the pyroxylin plastics industry. The figures indicated an increase in the importations of finished articles in the year 1928 over the year 1923 of about $1,200,000. It might be noted here that in valuing these figures, consideration should be given to the fact that these are based on the foreign value of the exporters' invoices. Were these valued in terms of American costs on labor and material, the increase would be one and one half to two times the above figure.

These imports consist mainly of dolls and toys, tooth brushes, tooth brush handles and combs. The record for 1929 through October on these is as follows:

Mr. A. E. Cameron
Secretary, Celluloid Corp.

Item	Quantity	Value	Unit Value
Combs	15,611,716	$ 492,270.00	$.0316
Dolls		990,250.00	
Tooth Brushes (Dozens)	2,270,974	849,183.00	.3730
Miscellaneous		929,582.00	
Tooth Brush Handles		70,348.00	
Total Value of Importations		**$3,331,633.00**	

Based on the above ten months, importations for the year will run almost $4,000,000.00, an increase over last year of 60% and will displace American products valued at from $7,000,000 to $8,000,000.

The Pyroxylin Plastics Manufacturers' Association has asked for relief to make possible the production of most of these items in the United States. The Association is confident that the increase in tariff asked for will not result in an increase in the cost of the finished article to the consumer. Data was submitted to both branches of Congress pointing out that the present tariff does not altogether compensate for the differential on low labor costs (particularly in foreign countries, where child labor is used), natural manufacturing advantages of some of the foreign countries or other advantages arising out of war readjustment.

Prior to the present year, importations of sheet material have been negligible and have been confined principally to sheets with novelty effects. However, with the advent of safety glass and a demand therewith for a volume of sheet material of standard specifications, a determined effort was made on the part of some foreign manufacturers to capture the American market. When the Pyroxylin Plastics Manufacturers' Association filed its brief before the Ways and Means Committee of the House in January, importations of safety glass material were only just beginning. As there was no record of importations over a period of years, the House granted only a slight increase over the present rate.

Five months later the Pyroxylin Plastics Manufacturers' Association appeared before the Finance Committee of the Senate. Five months' cumulative figures indicated that the importations of material for this purpose were fully as great if not greater than the amount of this same material being manufactured in this country. Although the Finance Committee recommended a still further increase in the rate on the floor of the Senate, this proposition was defeated and the rate reverted to that originally proposed to the House. Importations of sheet material for 1929 through October are as follows:

SHEETS

Pounds	Value
953,669	$798,824.00

Based on the above ten months, importations for the year will run over $1,000,000.00, an increase over last year of over 750%.

Included in the above are without doubt imports comparable to previous orders of novelty materials. Without question, however, the bulk of the above imports were for use in the manufacture of safety glass.

Bathroom Fixtures of Molded Resinoid Are Numerous

Heat and Humidity Resistant

CRYSTAL showers, sunken pools, and stained glass windows have come to be the setting of the modern bathroom since the trend in practical decorative interiors reached it several years ago. Bath-time songsters, likewise the afflicted devotees of steaming showers, will appreciate that, when it comes to switch plates and lighting fixture insulation, a material which is not attacked by water, which is persistently a non-conductor of electricity, and which is permanent in its retention of gloss and lustre, offers something in contrast to the old time vogue of metal. It need hardly be remarked, that metal corrodes with variable celerity in moist atmospheres. If it isn't the heat, it is the humidity that disturbs them. Thus, not merely in the electrical setting of the bathroom are phenol resinoid materials, under the trade-mark Bakelite, inaugurating new standards.

Wood Passé in Toilet Seats

One does not have to be a specialist in the problems of sales or other features of modern merchandising, to realize that, while wood is an excellent material, it was originally designed for a self-supporting purpose in the structure of trees. Naturally, it is hygroscopic. In the beautiful and utilitarian forms to which it is adapted, it will continue its sequence of centuries in the service of man. As an element in bathroom furniture, however, it would seem to be going out. In some forms of toilet seat design, wood is desirably used.

Steam Causes Peeling on Coated Surfaces

In these instances, wood is coated with pyroxylin plastics, or with rubber. Very good seats are made with wood cores covered with pyroxylin or hard rubber, but there are additional points of advantage in the resinoid materials. These are. undoubtedly, the result of a unit molding operation. That is, color, texture, chemical, and physical properties persist uniformly throughout the material, and are not merely a surface or layer effect. Even when a resinoid molded article is cored, the resinoid structure is still sufficiently thick, so that you get the characteristics of a non-hygroscopic and durable material.

A material which has contributed to airplanes and submarines, whose present uses range from fishing reels to furniture, may well be considered as being ready to assist the one-time plumber-contractor who now might be further characterized as an interior decorator with hydraulic ramifications.

With the passing of the prim, white bathroom, colored Bakelite molded toilet seats have found great favor with plumbing contractors because of their serviceability.

Allan Brown Speaks Out

QUALITATIVE and quantitative analysis is not confined to the chemical laboratory, but is being utilized in present-day application of science to advertising, according to Allan Brown, advertising manager, Bakelite Corporation. Addressing a recent luncheon meeting of the Newark Ad Club on the subject of applying science to advertising, Mr. Brown put his qualitative analysis principle to practical test by showing how it is possible, scientifically, to evaluate a number of papers in the same field of circulation. There are many factors involved in the modern business of advertising which the average business man does not appreciate. To direct a program of advertising is not merely to buy space and prepare copy, he continued, but involves a study of product, likewise a study of markets, media and distribution; also selection among many forms of advertising—direct mail, magazine, newspaper, outdoor display, etc. The preparation of copy, so called, is just one important detail.

Advertising, Mr. Brown continued, still suffers from lack of knowledge of its method and purpose on the part of company executives whose personal experience has been in other fields of work. Too often its real purpose has been misunderstood. The modern tendency of subjecting an advertising program to the systematic procedure of science is doing more than anything else to show directorates just how their advertising appropriation is being spent.

MANY PROBLEMS ARE FACED IN GREATER CHAIN STORE DISTRIBUTION OF MOLDED PRODUCTS

EXPECT NO HELP FROM THE LOW-PRICE CHAINS BECAUSE:

They Depend on Location to Attract Customers.

They Assume Their Merchandise Has Been Nationally Advertised by Manufacturers to the Consumer.

They Do "Institutional" Advertising Half-heartedly.

They Have no "Sales" to Announce—Their Goods are Marked as Low as Possible Already.

They Are "Utility" Stores—People Buy from Them only When They Need Something.

They Don't Know What's in An Article—And Don't Care, just so Long as It Gives Satisfaction for the Price.

They Are Purchasing Agents for the Community—Purchasing Agents that Buy Goods Demanded, and Stock them Just So Long as Public Acceptance Continues.

They Do Window Advertising, but Price Appeal is their only Sales Appeal.

By Philip de Angelis
Research Economist

THE question, as to why chain store distributors of molded products do not feature the characteristic properties of such articles in pushing their sale, seems to me a link in the chain of events that should lead towards greater production and wider application of molded products.

Of the various organizations visited, such as J. C. Penney Co., The Chain Store Age, The Chain Store Review and Percival White, authority on chain store organization and sales methods, each and all have unanimously given a negative answer. Many have already anticipated such an answer, but few, no doubt, have had the time to figure out why the chain stores haven't advertised extensively, let alone molded products, specifically.

When the question was asked, the startlingly brief answer would shoot out "Why should we? We don't need to advertise at all." When the writer, in turn asked "Why not?", explanations follow, which seem the most reasonable thing in the world. Advertising, to the chain store, is of secondary importance, if of any at all. The chain store depends upon a well-situated store and the attractive appeal of their window display for publicity. To squat down right in the busiest section of city, town, or village, is the best advertising scheme they have. The constant stream of workers, homekeepers, or idlers pass by their windows every day. They have flourished through smart merchandising. Quality merchandise, prompt service, and low prices have captured that passing and that buying public. They do not feel the need of gaining the interest of the public because they already have it. As long as they continue to sell merchandise which is satisfactory, and demand prices which the public can, and will pay without hesitation, the chain stores see no necessity for spending the vast sums of money which advertising demands.

Nationally Advertised Molded Products Have Big Appeal

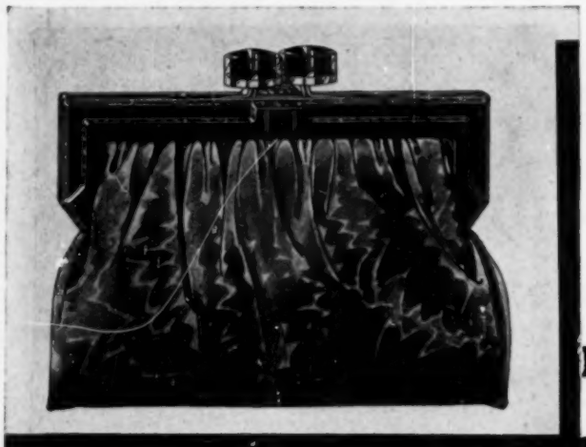
As for molded products, it is not the chain stores which are, or, should be, interested in advertising such, but the manufactures themselves. Many a manufacturer whose products the chains sell but do not advertise, announces to the public that such and such of his products are being sold by the chains. It is in this way that the consumer is informed of being able to procure such of the manufacturer's products as the latter wishes to promote. This is an excellent reason why chains, which waste extra capital on superfluous advertising, appear so nonchalant.

Chain Store Advertising Institutional Only

Of the few chain stores which advertise, F. W. Woolworth, J. C. Penney, Sears Roebuck, Montgomery Ward, and Western Auto Supply are the most outstanding. W. T. Grant might be mentioned as being most interested in any new product that appears on the market, and as endeavoring, by regular chain store methods, to bring it to the attention of the consumer. However, even these mentioned do very little advertising, and what is done is of an "institutional" kind. That is, they make a public announcement of their existence, picturing a heterogeneous array of miscellaneous commodities grouped into their respective departments without emphasis upon any one particular article or its substance. The various advertising media employed are The Saturday Evening Post, Literary Digest, Woman's Home Companion, Good Housekeeping and local newspapers, the last being the best for their purpose. It is interesting to note that Woolworth's only national advertising consists of a general announcement annually on their anniversary. It appeared this year in the Saturday Evening

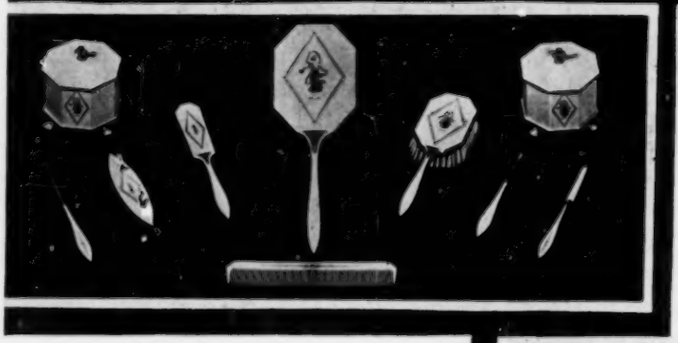
(Continued on page 40)

Hitting Plastic for the



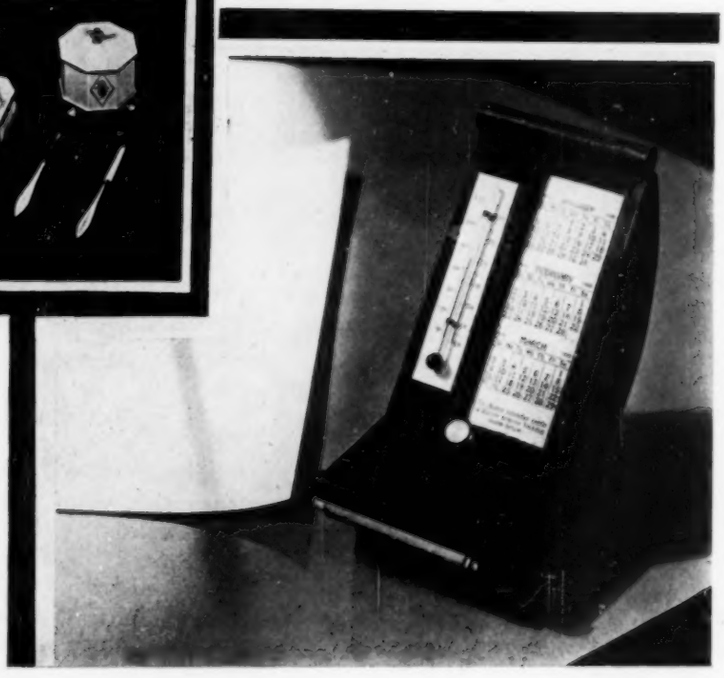
Kuhn and Jacob mold the frame and clasps on the purse out of Durez. A gift acceptable by mother, wife or sweetheart.

Beautiful Karolith articles make colorful ornaments for the home or the executive's office.



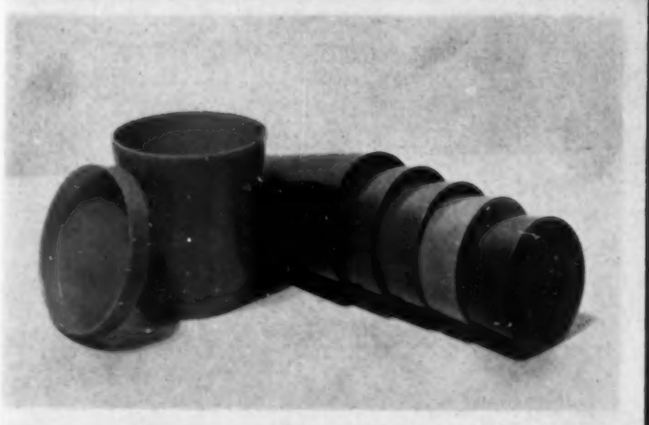
A new du Pont Pyralin ten piece toilet set, appropriate for the lady's boudoir.

A useful desk accessory is the Rokoblotter, molded in several colors of Durez by Mack Molding Co.



High Spots Xmas Shopper

Gentlemen's Amerith Military Set in Pearl-on-Amber with combination cigarette and cigar box.



Kurz-Kasch's erstwhile souvenir, molded in multi-colored Beetle, finds many purchasers in department stores.

Aldur Boudoir Lamp, in pastel shades, molded by Manchester Mfg. Co.

Kriss Kringle's workshop becomes a chemical laboratory wherein versatile Bakelite materials form gifts which make selection difficult.

Post. This year's was the most lengthy and most costly of all. The rest is window display.

"Institutional" advertisements bring up another stable prop for the negative side of the question. The chain stores do not need to advertise the unusual quality of any particular article. Their objective is to offer the consumer an unlimited line of "utility" stock at an unusually low price. They may announce three-for-a-quarter handkerchiefs, $1.00 hosiery of equal value to the $2.50 hosiery in Fifth Avenue shops, electrical appliances unusually cheap, novelties, which are good imitations of higher priced materials, automotive parts difficult to procure from the automobile companies, cheap grade aluminum kitchen ware, which looks like the real thing, etc. But it's what the public wants. A vast consuming public wants an article for 25c and doesn't care what it's made of as long as it's satisfactory.

Specific Advertising by Chains Is Superfluous

If the chains ever attempted to give to the public the unusual qualities of each kind of article in each one of their many departments, or try to educate the public as to that particular article's raw-material content, the cost would be tremendous and superfluous as well, since the public comes to them now without suggestions from advertisements other than window displays.

Large department stores usually advertise a bargain, some cut-price article of direct appeal for person or home. The chain stores cannot do this because their articles are already priced to the minimum. Since they have the reputation for being low-priced, no effort is necessary to attract the public except, again, by an appealing window display.

The chains cater, primarily, to women, mostly housewives. Do you think that if a chain store should, hypothetically speaking, advertise a mop for 5c, that had formerly been sold at 15c, that the housewife would come in and buy two mops instead of one? No! When she needs a mop, she will come in and buy it, but no special sale is going to entice her to the chain store unless she really has need of it. As long as the chains have in stock what the housewives need there is nothing gained in advertising.

Since the public has demanded cheapness as against quality from the chains, it often lead the buyers to slip into unscrupulous habits. Many a highly inflammable or easily destructible article has been sold by them because of its cheapness, and it may have sold like wildfire until harmful effects were heard. However, the chains have learned that housewives and the rest of their buying public are not to be fooled very long, and that if they don't sell them material that satisfies the first time, those customers won't come back. Consequently, their policies have changed. They still accept the article of the manufacturer who undersells, but they are careful to get sufficient quality to satisfy the consumer.

Utility and low price are the chain store's magnets to draw the public. If the molded products industry wants to educate them it must try to reach their consumers directly with any appeal or story. Molded articles manufacturers should not expect any direct-to-the-consumer advertising from the chain stores. They are not interested for the very simple reasons that it's waste of effort and money which should be directed in other channels.

Button Industry To Be Aided

As a direct step to check the decline in fresh-water mussels, upon which the pearl-button industry is dependent, the Federal Government is now planning the construction of a new hatchery at Fairport, Iowa, capable of producing approximately 750,000,000 mussels a year, according to Elmer Higgins, assistant in charge of scientific research of the Bureau of Fisheries, Department of Commerce. If the present plans are eventually realized the mussels will be propagated and kept in the hatchery until they reach the juvenile stage, after which they will be stocked in various waters, Mr. Higgins said.

Pearl Buttons One-Third Total

According to Mr. Higgins, each year products valued at $24,700,000 go into the manufacture of buttons of all kinds, and out of this amount fresh-water pearl mussels account for $8,000,000, or approximately one-third of the total.

Inasmuch as the pearl-button industry of America depends upon adequate natural supplies of fresh-water mussels, the restocking of the depleted mussel beds is of primary importance, he stated. One of the first obstacles, however, to restocking such beds is the increasing menace of pollution in the Mississippi and tributary rivers.

Pollution Severe

According to Mr. Higgins, in many extensive areas pollution has been found to be so severe that juvenile mussels produced by artificial propagation were unable to withstand the unfavorable conditions when planted in areas that were otherwise favorable. The Bureau, in cooperation with the several States, is conducting surveys of the various streams flowing into the Mississippi river and the Gulf in order to discover new localities more suitable for producing abundant supplies of mussel shells, he added.

Streams that are polluted usually contain quantities of sulphur compounds and some States such as Wisconsin and Minnesota are now taking steps to correct the situation.

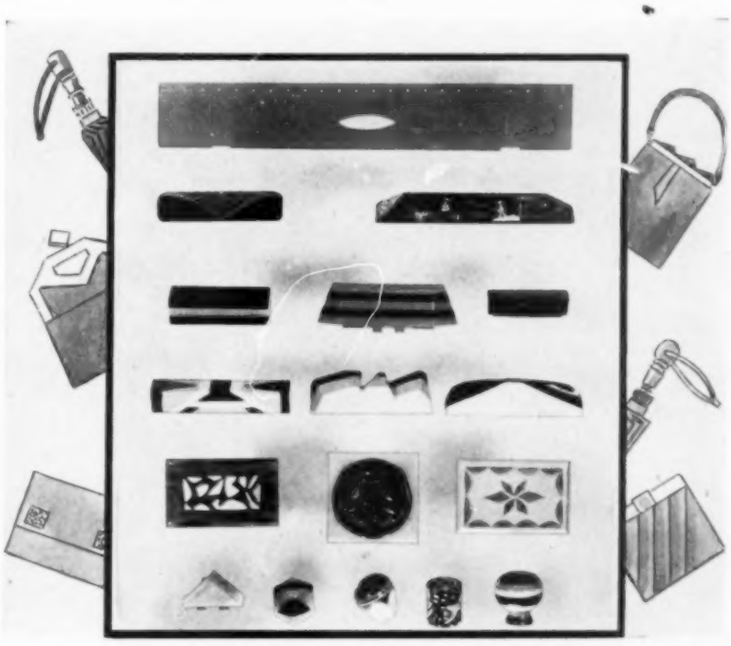
New Fashions in Apparel Widen Scope in Casein Ornaments

Karolith, Molded and Machined, Fills Many New Decorative Demands in Trimming Purses and Umbrellas

WITH the advent of each new season, and subsequent showings of women's fashions, one has come to accept with resignation detailed reports as to how Miss Park Avenue and Somebody's Stenographer should look. Particularly true is this at the present time when such a radical change has been made from the boyish form of several years standing to a silhouetted, truly feminine, one. Women's clubs have taken advantage of this ripe and timely topic with discussions which have merited first page news.

Appeal Universal in Varied Shape sand Colors

While of course this affects, in the main, apparel designers, it opens up to the manufacturers of accessories for women, a fertile field. Regardless of where and when the hemline is to end, attention is being focused on blended ensembles, and new conceits find their market all too eager to welcome them. Casein plastic materials have been fabricated into a multifarious variety of fittings, the Karolith pieces shown herewith an excellent example—as well as a black and white reproduction will permit—of the color possibilities and modernistic, geometric shapes possible. No longer does it suffice to have one costumed in any one particular color and yet be considered smart. The trick lies in the details being harmoniously blended, with, for example, mounted trimmings of bags, shoes or umbrellas matched or contrasted.



The eternal cry for variety in fashions is stilled with these unusual trimmings made of Karolith. Milady will never be unadorned as long as so such colorful, versatile materials are available.

Thus we find in the Karolith Corp.'s new developments of casein solids a host of wide applications. Undoubtedly, one of its most pronounced features is its ability to simulate gems; in fact one of its most subtle advantages. Another great advantage is the relative ease with which these materials may be fashioned into shapes of intricate design, a reason for the execution of modern, geometric shapes. Also, where conventional shapes are desired, colors may be combined in the modernistic manner, giving a new treatment to an old form. This is particularly appropriate for tops of umbrellas, and frames, clasps and ornaments on hand bags.

Two Color Modern Cameos of Casein for the Bag

The accompanying illustration brings to light a few of these new uses. Taxis are still not so all-prevalent that the umbrella has been discarded. Handles of beautifully colored Karolith in both odd and conventional shapes are very pleasing. Bags this season are finding their greatest attraction in frames and clasps, or are characterized by the complete lack of handles. These last bear corner ornaments, very often in the cameo or medallion style, either in the old manner or in a modernistic adaptation. These ornaments are capable of being produced in Karolith molded, thus eliminating the sometimes costly method of machining, yet retaining all the highly desirable properties that casein plastics have.

Molded Boxes are Coming Into Their Own

Molded Containers for all varieties of Merchandise are steadily increasing in number with the further possibilities still abundant

By H. S. Spencer
General Plastics, Inc.

IT seems to have taken a long time for manufacturers to awake to the advantages of the phenolic molded box or container coming within the box classification.

Was this the fault of the molders of plastics, manufacturers who could use containers of this class?

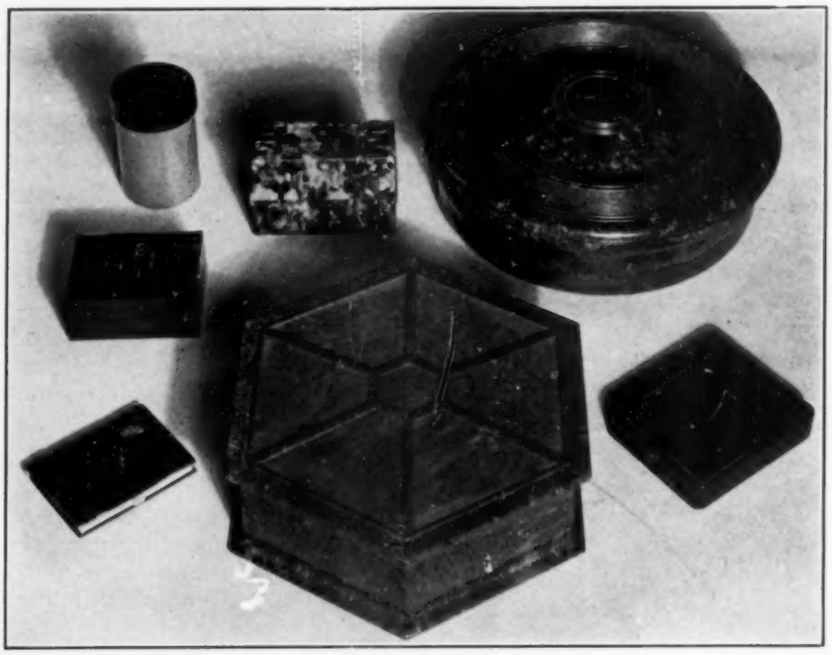
The advantages of the molded box beyond the possible objection of greater cost, are many; probably the outstanding one being permanency, that is that the box may be used as a refill case or have a secondary use. The new Pinaud powder box is an excellent example of a practical box of lasting beauty, its modern design, yet conservative and artistic lines, having real beauty. It has strength, it seals tightly, is leak proof, a decided advantage in powder boxes for the traveler.

A Combination Candy and Sewing Box

The Domart Sewing Box illustrated here, when packed with Park & Tilford and other candy, is an excellent gift, one that is useful and permanent, for the permanent features are not effected by the temporary use of the box as one for candy. We believe there are enough old fashioned ladies who stick to candy and sewing, even in this day of cigarette ads and ready-to-wears, to provide a volume of sales worth while.

General Plastics' color sample case is another novel and practical use of a molded box, demonstrating as well the possibility of phenolic materials in colors, and beyond serving as a sample box, finds use for trinkets and may be used as a playing card case.

The watch boxes molded by Northern Industrial Chemical Company and Kurz-Kasch, Inc., are beautiful and sufficiently attractive to carry the finest watches made. Ring boxes are another practical jewelry possibility.



Courtesy Modern Packaging
Some of the many containers, described in this article, molded out of Synthetic Resinoids.

The molded box offers color and color effects, different and often expensive where the process of securing them is confined to printing.

In large production, the molded box can be produced at comparative cost to built up paper boxes and is superior in strnegth, longevity and permanency, for dampness, atmospheric conditions, etc., neither effect the box nor its contents. It is also produced with greater accuracy and with less frequent interruptions to deliver it. Its continuous opening and closing has no destructive effect upon it.

The containers of phenolic resoids are coming into their own and the future will see, we believe, a decided increase in their number, for the practical and possible undeveloped opportunities are many.

New Wood Flour Plant in New Hampshire

According to reports from the Burnet Company, the New England Wood Flour Corp. has built a new plant of three units on the site of the old plant at Suncook. Each of these new units will have the capacity of the old factory and are so laid out that there is no chance of being completely shut down. Cost of the new plant is considerably over $200,000.

The old plant was practically destroyed by fire some months ago, but operation is about to begin again. They will continue to supply the plastic and other industries as heretofore. The Burnet Co. are sales agents.

British Safety Glass Companies Have Bad Year

By A. C. Blackall

British Correspondent

EVIDENCE is accumulating of the great difficulties experienced by companies engaged in the manufacture of safety glass in working at a profit in the past year in Britain. This was due mainly to the great addition to the number of enterprises engaged in its manufacture. Even the Triplex Safety Glass Co., which for 1927-8 paid a 20 per cent dividend and distributed a capital bonus of 100 per cent, reports a net profit of only £2,657 ($13,285), against £41,452 ($207,260) for the year ended June 30 last, and no dividend is to be paid.

To meet the situation created by the advent of much fresh competition, the firm's factories at King's Norton "were required to increase production more rapidly than was possible on an economically sound basis, which resulted in high cost of production and a large percentage of waste." During the year £127,635 was expended on the completion of the building program and plant and equipment. These various items of expenditure were financed by a fresh issue of stock at £3 premium per share last January, while a further issue of 50,000 shares is now contemplated, largely to take up shares in a subsidiary, Triplex (Northern), Ltd.

Triplex Output to be Doubled Next Year

The firm's factories are planned to give an output of from three to four million feet of triplex per annum, but at present are delivering at the rate of about 2,000,000 feet per annum. Next year it is expected that the figure will be 3,000,000, with the prospect of a gradual increase thereafter to 4,000,000 ft. or more.

"Safety glass is practically established as a necessary part of the equipment of automobiles sold in this country," said the chairman, Lieut.-Col. O. C. Clare, at the recent annual meeting of the Triplex Co. in London, "and there is also the possibility of safety glass being made compulsory in public service vehicles. Of the resultant business, Triplex has secured at least 75 per cent, so that the magnitude of our production should alow us to sell with profit at prices that do not invite permanent competition."

Statements of Small Firms All Show Losses

Another and more recently formed company, Acetex Safety Glass, has just issued its first report, showing a total loss of £25,742 ($128,710), although the directors express the belief that "a sufficient increase in business will be obtained in the future to make the business profitable."

The Lancegaye Safety Glass Co. has issued an interim report in which it is stated that the matter of a fluid press is engaging the earnest attention of the directors. Various forms are now in construction, but in order to avoid delay in manufacture a number of solid presses have been installed and are stated to be giving excellent results. The cost of installation of the plant has been considerably less than estimated, and production is now being commenced on a commercial scale.

The early stages of the career of the British Safety Glass Co., have been fraught with many difficulties. Sir Philip Dawson and two other directors recently resigned from the board. Of the original directors, Mr. Lickfold resigned in August and Mr. Garry resigned in September.

Several of the directors and their friends came to the company's assistance with loans and, in all probability it would have surmounted its difficulties had it not been for the fact that it was found impossible to secure the sum owing from the issuing house. Consequently the company was unable to satisfy its chief creditor who obtained judgment against it, and proceeded to put the same into execution. Another of the creditors has also filed a petition for the winding up of the company. A short stay of execution has been obtained, and the directors are meanwhile endeavoring to secure temporary assistance with a view to possible reconstructio nof the company.

The resignation of Mr. Garry was due to disagreement on the question of financial policy, while Sir Philip Dawson resigned owing to the pressure of other business.

British Plastic Trade Association Formed

AS already announced in PLASTICS, a new association has been formed in England under the title of "The Plastics Trade Association."

The committee appointed consisted of representatives of Bakelite, Ltd., Birkbys, Ltd., Jas. Ferguson & Sons, Ltd., Kelacoma, Ltd., Rissik, Fraser & Co., Ltd., as representing the material makers; H. E. Ashdown, Brownie Wireless Co., Ebonestos Insulators, Ltd., Insulators, Ltd., and Streetly Manufacturing Co.; while others interested, but unattached, included C. T. O'Callaghan, C. S. Dingley, and F. C. Higgins (mould maker).

In all about 50 representatives of the various sides of the industry attended. Mr. James Macfarlane presided, and after the election of the committee, it was decided that a permanent chairman should be elected by that body. Mr. M. P. Macfarlane who was instrumental in bringing the meeting together, was awarded a hearty vote of thanks and was elected secretary pro: tem:. An open meeting to which every member of the trade was invited was to be held on December 3.

NEWS *of the* INDUSTRY

NEMA MEETING

AT 9:30 on the morning of Tuesday, January 14th, the NEMA Molded Section will meet at the Statler Hotel, Buffalo, to consider the proposed uniform contract form on which the Executive Committee of the Section will make recommendations.

Other matters to be acted on will be given on the agenda for the meeting which will be sent out sufficiently in advance to permit everybody to come prepared to act on each subject to be presented.

This notice is being sent out well in advance with the request that each member reserve the date of January 14th for this meeting.

Stewart N. Clarkson.
Assistant to Director.

Covell on Makalot Staff

Makalot Corp., of Waltham, Mass., manufacturers of molding powder, announce the addition of Mr. Bradford S. Covell to their staff. Mr. Covell is a graduate of Yale and Columbia and comes to Makalot highly recommended from the Westinghouse Research Department in which connection he made many contacts in the plastic industry.

New Molder in the Field

According to reports received, a new custom molding concern has been established on the West Coast. Eichlin and Echlin, 799 Golden Gate Avenue, San Francisco, Cal., will be ready to operate some time in January, 1930.

New Flexo Leaflet

The Flexo Supply Company, manufacturers of swing joints, is distributing a leaflet pointing out the many uses their products are finding in the plastic molding and similar industries.

Control of Pyroxylin Plastics by German Dye Cartel

The German dye cartel has acquired control of the Rheinische Gumi-und Celluloidfabrik A. G., at Mannheim Neckersau, thus adding to its list of affiliates which include the Deutsche Celluloid Fabrik, Eilenburg; Rheinish-Westfaelische Sprengstoff A. G., Cologne; Wolff & Co., A. K., Walsrode, This combination of producers easily makes by far the greater share of German "celluloid" production, which may be estimated at about 12,000 metric tons annually. Other firms have a comparatively small output of pyroxylin plastics and include the Westfaelisch-Anhaltische Sprengstoff (Wittenberge); Celluloidfabrik Korvmeyer & Scherer, Speyer; Westdeutsche Celluloidfabrik, Lang/Rhein; A. Hagedorn & Co., Osnabrueck.

The dye combine enlisted its explosive factors in acquiring

the 4,000,000 mark common share and 6,000,000 mark preferred stock of the Rheinische Gumni-und Celluloidfabrik A. G. The latter wil not alter its production policy, but may be expected to produce more under I. G. control.

Carbide and Carbon Announces New Resin

Carbide and Carbon Chemicals Corp. announces a new synthetic resin, Vinylite, available in lacquer and molding powder forms. Vinylite is moldable with or without fillers. The resin is white, making it possible to mold objects in translucent pastel or solid, brilliant shades.

Japan to Produce Synthetic Acetic Acid

The Japan Synthetic Chemical Co., at Ogaki, Gifu Prefecture, the largest producer of acetic acid in Japan, was recently taken over by the Mitsui interests, which raised the capital from 200,000 yen to 1,000,000 yen.

A study has been made of the manufacture of synthetic acetic acid, but so far the output has been very small. Large quantities of acetic acid have been imported from Germany and the United States, and it is the aim of Mitsui & Co. to increase the local production of synthetic acetic acid. The company heretofore supplied 80 per cent of the demand for domestic acetic acid and now controls the entire supply. The Japan Synthetic Chemical Co.'s new factory at Ogaki was completed in September of this year, and it is expected that the new machinery will be installed during November.

The Mitsui interests estimate that 90 per cent of the domestic demand for acetic acid will be supplied by the new company, which is the only establishment in Japan using the synthetic process of manufacture, and it is reported that the Government has decided to grant 30,000 yen this year towards the encouragement of the industry. (Consul A. R. Preston, Nagoya, Japan).

Phenyl Ethyl Alcohol Imports Increase

Total imports of 22,610 pounds of phenyl ethyl alcohol entered for consumption during the first ten months of 1929 registered an increase of nearly 22 per cent over imports during the corresponding period of 1928 when 18,560 pounds were entered. This increase may be attributed, to a great extent, to much larger imports during the last two months of the 1929 period, as compared with imports in the same months of 1928.

In the 1929 period under review, Switzerland was the most important supplier of this commodity by a much wider margin than in 1928, supplying 15,388 pounds in January—October 1929 as compared with 6,121 pounds during January—October 1928.

Monsanto Acquires British Tar Company

FURTHER expansion in Europe of the activities of Monsanto Chemical Works, St. Louis, is reflected in the purchase of the Sunderland Tar Distilling Works, formerly owned by Brotherton & Co., Limited, Leeds, England.

The additional property will be taken over by Graesser-Monsanto Chemical Works, Ltd., Monsanto's English subsidiary.

BUYERS' GUIDE

ACCUMULATORS
The Burroughs Co.
John J. Cavagnaro, Harrison, N. J.
The Dunning & Boschert Press Co., Inc.
Chas. F. Elmes Engineering Works
R. D. Wood
A. B. Farquhar

ALADDINITE
Aladdinite Co.

ALCOHOL
U. S. Industrial Alcohol Co.

ALDUR
Aldur Corporation

BEETLE
Synthetic Plastics Co.

BAKELITE
Bakelite Corporation

BLOOD
Jungmann & Co.

CASEIN
Jungmann & Co.
American-British Chemical Supplies, Inc.

CASEIN PLASTICS
Aladdinite Co.
Karolith Corp.
Erinoid Co. of America

CELLULOSE ACETATE
American-British Chemical Supplies, Inc.

CONTAINERS
Carpenter Container Corp.

COTTON FLOCK
Claremont Waste Mfg. Co.
Peckham Mfg. Co.

CUSTOM MOULDERS
Allen & Hills, Inc.
American Insulator Corp.
Boonton Moulding Co.
Colt's Patent Fire Arms M'f'g. Co.
Diemoulding Production Co.
General Elec. Co.
Kuhn & Jacob, Trenton, N. J.
Kurz-Kasch Co., Dayton, Ohio
Manchester Mfg. Co.
Monowatt Electric Corp.
Northern Indus. Chem. Co., Boston, Mass.
Norton Laboratories, Lockport, N. Y.
Recto Mfg. Co., Cincinnati, Ohio
Scranton Button Co., Scranton, Pa.
Shaw Insulator Co.
Siemon Co.
Jos. Stokes Rubber Co.

DIAMOND TOOLS
F. F. Gilmore & Co.

DIES
Standard Tool Co.

DUREZ
General Plastics Inc.

ERINOID
Erinoid Co. of America

FIBERLOID
Fiberloid Corp.

GLASS, SILVERED
Standard Mirror Co.

HEAT REGISTERING INSTRUMENTS
Cambridge Instrument Co.

KAROLITH
Karolith Corp.
LABELS
Economy Ticket & Label Co.
MANICURE ARTICLES
C. J. Bates & Sons, Chester, Conn.
MEASURING MACHINES
F. J. Stokes Mach. Co.
MIRRORS
Standard Mirror Co.
Tassi Bros.
MOLDING EQUIPMENT
Albert & Son, L.
Fred S. Carver, N. Y.
John J. Cavagnaro,
Evarts G. Loomis Co.
Terkelsen Machine Co.
Burroughs Co., The
Chas. F. Elmes Engineering Works
Southwark Foundry & Mach. Co.
Standard Machinery Co.
Thropp, Wm. R. & Sons, Co.
Dunning & Boschert Press Co.
French Oil Mill Machinery Co.
A. B. Farquhar
R. D. Wood Corp.
MOLDING POWDERS
Bakelite Corp.
General Plastics, Inc.
Luco Products Corp.
Synthetic Plastics Co., Inc.
PEARL COATING
American Pearl Essence Co.
PHENOL
Dow Chemical Co.
PHENOL RESINOIDS
Bakelite Corporation
General Plastics Inc.
PLASTICIZERS
American-British Chemical Supplies, Inc.
Kuttroff, Pickhardt & Co., Inc.
PREFORMING PRESSES
Arthur Colton Co.
F. J. Stokes Mach. Co.
PYROXYLIN PLASTICS
Fiberloid Corp.
Celluloid Corp.
Du Pont Viscoloid Co.
E. W. Wiggins
STEEL, TOOL
Wm. Jessop & Sons, Inc.
SWING JOINTS
Burroughs Co., The
Evarts G. Loomis Co.
French Oil Machinery Co.
Flexo Supply Co.
TOOLS
Standard Tool Co.
TUMBLING
Rudolph R. Siebert
UREA-FORMALDEHYDE RESINS
Aldur Corporation
Synthetic Plastics Co., Inc.
VARNISHES, SYNTHETIC RESIN
Bakelite Corp.
General Plastics, Inc.
WOOD FLOUR
Becker Moore Co.
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Jungmann & Co.
State Chemical Co.

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Say you saw it in PLASTICS

Exports of United States Pyroxylin Products, By Countries
September, 1929

Countries	Sheets, rods, or tubes Pounds	Sheets, rods, or tubes Dollars	Manufactures Pounds	Manufactures Dollars
Denmark	.....	.....	70	109
France	5,570	613	51	361
Germany	1,363	671	16	132
Italy	6,542	7,237	.....	.....
Netherlands	3,314	3,680	23	171
Sweden	.....	.....	60	136
Switzerland	.....	.....	30	181
United Kingdom	60,080	41,760	44,675	21,957
Canada	86,240	64,085	35,727	49,588
B. Honduras	.....	.....	29	62
Costa Rica	80	84	.....	.....
Guatemala	.....	.....	226	698
Honduras	.....	.....	6	10
Nicaragua	.....	.....	65	65
Panama	21	25	1,246	870
Salvador	.....	.....	44	232
Mexico	74	69	4,316	9,370
Newfoundland & Labrador	.....	.....	202	188
Bermudas	.....	.....	25	37
Jamaica	76	88	12	20
Trinidad & Tobago	10	13	.....	.....
Other B. W. Indies	.....	.....	120	215
Cuba	380	386	799	2,122
Haiti, Republic of	.....	.....	33	124
Argentina	.....	.....	256	770
Bolivia	.....	.....	25	51
Brazil	512	444	106	218
Chile	.....	.....	162	58
Colombia	.....	.....	32	241
Ecudor	.....	.....	9	38
Uruguay	.....	.....	323	673
Venezuela	80	93	215	633
B. India	.....	.....	172	93
China	.....	.....	447	627
Java & Madura	.....	.....	170	160
F. Indo-China	.....	.....	11	11
Hong Kong	.....	.....	251	260
Philippine Islands	.....	.....	921	1,089
Australia	11,865	8,534	15,688	12,206
B. Oceania	.....	.....	11	13
New Zealand	407	305	30	63
Union of So. Africa	267	204	1,367	1,785
Total	176,881	128,291	107,971	105,637
Shipments from U. S. to:				
Hawaii	104	119	1,023	2,193
Porto Rico	.....	.....	94	155

And Now, In Closing:

GREETINGS! . . . Last month's Molded Products started something. That something, it is true, was mostly talk, but we are expecting retributive letters every day. Perhaps we should say more retributive letters. Those we have we don't dare print. We have talked with most of the men whose letters composed the article in December, and we feel that they were all sincere in their comments and suggestions. It seems highly improbable, however, that the points raised will not be the basis for some future action. And we don't mean talk. We were honored to have the letters we published; honored, in fact, to have them read. We would be equally receptive to any answering communications,—and equally impartial in their printing.

—o—

WITH more in the nature of a postscript. Harry Dent, unfortunately, was unable to get his letter to us in time for publication. We still have it, and will be glad to show copies of it to any interested.

—o—

AND more rehash, and addenda. December's column on page 675 also started things! We print here a definition of its meaning, supplied, without prompting, (and very correctly) by a molder in Connecticut:

"You are evidently highly enthusiastic about hot molding and enthusiastic about cold."

Vale! [And in case you like guesses, there are seven recognized custom molders in Connecticut].

—o—

DR. ALADIN, whose pen name is entirely necessary, has written a patent summary that should be a distinct time saver for reference work. It has already been running some time and has several more installments coming before completion. We mention this now since it will serve as an answer to various enquiring letters. We also wish to add that it is impossible for us to supply a preprinting of this work. If there is sufficient demand we will gladly have it printed in booklet form as an added convenience for subscribers. Those who have followed it know how fortunate it is to have such a laborious work for public use, so we have therefore made the suggestion about a booklet.

And Then, In February:

WE will present our annual survey of business that has become such an important feature in the past. The trend of the entire industry, as well as production figures, will be given in toto and then broken down more specifically. Several leaders in the various branches will work in conjunction with PLASTICS to complete the survey and establish its authenticity.

—o—

WHILE European production has been mentioned in the past, several important items and statistics on foreign trade will appear for the first time in this issue. In other words, it will be international in its scope and consequently much more complete than formerly.

—o—

WE are inclined to say that over fifty per cent of the fires in the past year have been attributed either to cigarette butts or pyroxylin. It seems to be a sort of fad similar to, say, calling Al Capone guilty for every gang murder in Chicago. We suppose that people who investigate such things have to have some excuse for a fire's origin, but of all the causes for fires no other two could be so improbable. We also suppose that not more than one per cent of such fires are actually started by either of them. Usually there is a contributing cause, such as pyroxylin solvents, that is responsible. Since we are primarily concerned with it and not with O. P. Bs., we mention here that pyroxylin has a habit of consuming itself so that, if it were at fault, the corpus delicti would be absent. Then too, anyone near enough to witness the cause, if it were pyroxylin, would seldom live to tell about it.

—o—

WE look upon the Revived British Plastic industry with a bit of good natured awe. Needless to say we are impressed, especially with the perseverance of a Mr. M. P. McFarlane in trying to join all the branches of the industry into one big, happy association for the good of everybody. Again we pause to say we are impressed. We sincerely hope it may be successfully accomplished, but so far it never has been. Molders will be molders and supply houses, supply houses and so on. They have problems in common,—hundreds of them. But they will solve them, if any, apart. Don't take our sayso for it but wait and see. To do otherwise would be unnatural.

We are glad to note, however, a more even trend in European markets and industries. This is a result of several things, many of which will be brought out in the February issue.

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Again: greater prosperity and abundant happiness for the coming year.